



Micro Commercial Components  
20736 Marilla Street Chatsworth  
CA 91311  
Phone: (818) 701-4933  
Fax: (818) 701-4939

**1N5338B  
THRU  
1N5369B**

## Features

- Zener Voltage From 5.1V to 51V
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Lead Free Finish/RoHS Compliant (Note1) ("P" Suffix designates Compliant. See ordering information)
- Marking : Cathode band and type number

## Maximum Ratings:

- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- 5 Watt DC Power Dissipation
- Maximum Forward Voltage @ 1A: 1.2 Volts
- Power Derating: 40 mW/°C Above 75°C
- Maximum thermal resistance: 25C/W from junction to ambient

## Mechanical Data

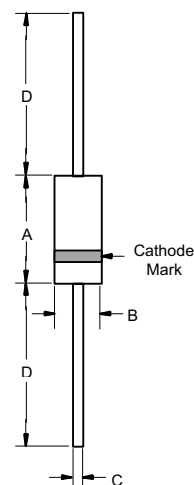
Case: JEDEC DO-15.

Terminals: Solder plated , solderable per MIL-STD-750,  
Method 2026.

Standard Packaging: 52mm tape

**5 Watt  
Zener Diode  
5.1 to 51 Volts**

DO-15



| DIMENSIONS |        |      |       |      |      |
|------------|--------|------|-------|------|------|
| DIM        | INCHES |      | MM    |      | NOTE |
|            | MIN    | MAX  | MIN   | MAX  |      |
| A          | .230   | .300 | 5.80  | 7.60 |      |
| B          | .104   | .140 | 2.60  | 3.60 |      |
| C          | .026   | .034 | .70   | .90  |      |
| D          | 1.000  | ---  | 25.40 | ---  |      |

Note: 1. High Temperature Solder Exemption Applied, see EU Directive Annex 7.

# 1N5338B THRU 1N5369B

ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted, V<sub>F</sub>=1.2 Max @ I<sub>F</sub>=1A for all types).

| MCC PART NUMBER | REGULATOR VOLTAGE<br>V <sub>Z</sub><br>(Note2) | TEST CURRENT<br>I <sub>ZT</sub> | MAXIMUM DYNAMIC IMPEDANCE<br>Z <sub>ZK</sub> (@I <sub>ZT</sub> )<br>(Note2) | MAXIMUM REVERSE CURRENT<br>I <sub>R</sub> | TEST VOLTAGE<br>V <sub>R</sub> | MAXIMUM REGULATOR CURRENT<br>I <sub>ZM</sub><br>(Note5) | MAXIMUM DYNAMIC KNEE IMPEDANCE<br>ZZK@ 1.0mA<br>(Note2) | MAXIMUM SURGE CURRENT<br>I <sub>s</sub><br>(Note3) | MAXIMUM VOLTAGE REGULATION<br>(Note4) |
|-----------------|------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------|-------------------------------------------|--------------------------------|---------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------|---------------------------------------|
|                 | VOLTS                                          | mA                              | OHMS                                                                        | μA                                        | VOLTS                          | mA                                                      | ohms                                                    | A                                                  | VOLTS                                 |
| 1N5338B         | 5.1                                            | 240                             | 1.5                                                                         | 1.0                                       | 1.0                            | 930                                                     | 400                                                     | 14.4                                               | 0.39                                  |
| 1N5339B         | 5.6                                            | 220                             | 1.0                                                                         | 1.0                                       | 2.0                            | 865                                                     | 400                                                     | 13.4                                               | 0.25                                  |
| 1N5340B         | 6.0                                            | 200                             | 1.0                                                                         | 1.0                                       | 3.0                            | 790                                                     | 300                                                     | 12.7                                               | 0.19                                  |
| 1N5341B         | 6.2                                            | 200                             | 1.0                                                                         | 1.0                                       | 3.0                            | 765                                                     | 200                                                     | 12.4                                               | 0.10                                  |
| 1N5342B         | 6.8                                            | 175                             | 1.0                                                                         | 10                                        | 5.2                            | 700                                                     | 200                                                     | 11.5                                               | 0.15                                  |
| 1N5343B         | 7.5                                            | 175                             | 1.5                                                                         | 10                                        | 5.7                            | 630                                                     | 200                                                     | 10.7                                               | 0.15                                  |
| 1N5344B         | 8.2                                            | 150                             | 1.5                                                                         | 10                                        | 6.2                            | 580                                                     | 200                                                     | 10                                                 | 0.20                                  |
| 1N5345B         | 8.7                                            | 150                             | 2.0                                                                         | 10                                        | 6.6                            | 545                                                     | 200                                                     | 9.5                                                | 0.20                                  |
| 1N5346B         | 9.1                                            | 150                             | 2.0                                                                         | 7.5                                       | 6.9                            | 520                                                     | 150                                                     | 9.2                                                | 0.22                                  |
| 1N5347B         | 10                                             | 125                             | 2.0                                                                         | 5.0                                       | 7.6                            | 475                                                     | 125                                                     | 8.6                                                | 0.22                                  |
| 1N5348B         | 11                                             | 125                             | 2.5                                                                         | 5.0                                       | 8.4                            | 430                                                     | 125                                                     | 8.0                                                | 0.25                                  |
| 1N5349B         | 12                                             | 100                             | 2.5                                                                         | 2.0                                       | 9.1                            | 395                                                     | 125                                                     | 7.5                                                | 0.25                                  |
| 1N5350B         | 13                                             | 100                             | 2.5                                                                         | 1.0                                       | 9.9                            | 365                                                     | 100                                                     | 7.0                                                | 0.25                                  |
| 1N5351B         | 14                                             | 100                             | 2.5                                                                         | 1.0                                       | 10.6                           | 340                                                     | 75                                                      | 6.7                                                | 0.25                                  |
| 1N5352B         | 15                                             | 75                              | 2.5                                                                         | 1.0                                       | 11.5                           | 315                                                     | 75                                                      | 6.3                                                | 0.25                                  |
| 1N5353B         | 16                                             | 75                              | 2.5                                                                         | 1.0                                       | 12.2                           | 295                                                     | 75                                                      | 6.0                                                | 0.30                                  |
| 1N5354B         | 17                                             | 70                              | 2.5                                                                         | 0.5                                       | 12.9                           | 280                                                     | 75                                                      | 5.8                                                | 0.35                                  |
| 1N5355B         | 18                                             | 65                              | 2.5                                                                         | 0.5                                       | 13.7                           | 264                                                     | 75                                                      | 5.5                                                | 0.40                                  |
| 1N5356B         | 19                                             | 65                              | 3.0                                                                         | 0.5                                       | 14.4                           | 250                                                     | 75                                                      | 5.3                                                | .040                                  |
| 1N5357B         | 20                                             | 65                              | 3.0                                                                         | 0.5                                       | 15.2                           | 237                                                     | 75                                                      | 5.1                                                | .040                                  |
| 1N5358B         | 22                                             | 50                              | 3.5                                                                         | 0.5                                       | 16.7                           | 216                                                     | 75                                                      | 4.7                                                | 0.45                                  |
| 1N5359B         | 24                                             | 50                              | 3.5                                                                         | 0.5                                       | 18.2                           | 198                                                     | 100                                                     | 4.4                                                | 0.55                                  |
| 1N5360B         | 25                                             | 50                              | 4.0                                                                         | 0.5                                       | 19                             | 190                                                     | 110                                                     | 4.3                                                | 0.55                                  |
| 1N5361B         | 27                                             | 50                              | 5.0                                                                         | 0.5                                       | 20.6                           | 176                                                     | 120                                                     | 4.1                                                | 0.60                                  |
| 1N5362B         | 28                                             | 50                              | 6.0                                                                         | 0.5                                       | 21.2                           | 170                                                     | 130                                                     | 3.9                                                | 0.60                                  |
| 1N5363B         | 30                                             | 40                              | 8.0                                                                         | 0.5                                       | 22.8                           | 158                                                     | 140                                                     | 3.7                                                | 0.60                                  |
| 1N5364B         | 33                                             | 40                              | 10                                                                          | 0.5                                       | 25.1                           | 144                                                     | 150                                                     | 3.5                                                | 0.60                                  |
| 1N5365B         | 36                                             | 30                              | 11                                                                          | 0.5                                       | 27.4                           | 132                                                     | 160                                                     | 3.3                                                | 0.65                                  |
| 1N5366B         | 39                                             | 30                              | 14                                                                          | 0.5                                       | 29.7                           | 122                                                     | 170                                                     | 3.1                                                | 0.65                                  |
| 1N5367B         | 43                                             | 30                              | 20                                                                          | 0.5                                       | 32.7                           | 110                                                     | 190                                                     | 2.8                                                | 0.70                                  |
| 1N5368B         | 47                                             | 25                              | 25                                                                          | 0.5                                       | 35.8                           | 100                                                     | 210                                                     | 2.7                                                | 0.80                                  |
| 1N5369B         | 51                                             | 25                              | 27                                                                          | 0.5                                       | 38.8                           | 93                                                      | 230                                                     | 2.5                                                | 0.90                                  |

## NOTE:

1. TOLERANCE AND VOLTAGE DESIGNATION - The JEDEC type numbers shown indicate a tolerance of +/-10% with guaranteed limits on only V<sub>Z</sub>, I<sub>R</sub>, I<sub>s</sub>, and V<sub>F</sub> as shown in the electrical characteristics table. Units with guaranteed limits on all seven parameters are indicated by suffix "B" for +/-5% tolerance.
2. ZENER VOLTAGE (V<sub>Z</sub>) AND IMPEDANCE (Z<sub>ZT</sub> & Z<sub>ZK</sub>) - Test conditions for Zener voltage and impedance are as follows; I<sub>Z</sub> is applied 40+/-10 ms prior to reading. Mounting contacts are located from the inside edge of mounting clips to the body of the diode(T<sub>a</sub>=25°C )

# 1N5338B THRU 1N5369B

3. SURGE CURRENT ( $I_r$ ) - Surge current is specified as the maximum allowable peak, non-recurrent square-wave current with a pulse width, PW, of 8.3 ms. The data given in Figure 5 may be used to find the maximum surge current for a square wave of any pulse width between 1 ms and 1000ms by plotting the applicable points on logarithmic paper. Examples of this, using the 6.8v, is shown in Figure 6. Mounting contact located as specified in Note 3. ( $T_A=25^\circ\text{C}$ ).
4. VOLTAGE REGULATION ( $V_z$ ) - Test conditions for voltage regulation are as follows:  $V_z$  measurements are made at 10% and then at 50% of the  $I_z$  max value listed in the electrical characteristics table. The test currents are the same for the 5% and 10% tolerance devices. The test current time duration for each  $V_z$  measurement is 40+/- 10 ms. ( $T_A=25^\circ\text{C}$ ). Mounting contact located as specified in Note2.
5. MAXIMUM REGULATOR CURRENT ( $I_{ZM}$ ) - The maximum current shown is based on the maximum voltage of a 5% type unit. Therefore, it applies only to the B-suffix device. The actual  $I_{ZM}$  for any device may not exceed the value of 5 watts divided by the actual  $V_z$  of the device.  $T_L=75^\circ\text{C}$  at maximum from the device body.

## APPLICATION NOTE:

Since the actual voltage available from a given Zener diode is temperature dependent, it is necessary to determine junction temperature under any set of operating conditions in order to calculate its value. The following procedure is recommended:

Lead Temperature,  $T_L$ , should be determined from:

$$T_L = \theta_{LA} P_D + T_A$$

$\theta_{LA}$  is the lead-to-ambient thermal resistance and  $P_D$  is the power dissipation.

Junction Temperature,  $T_J$ , may be found from:

$$T_J = T_L + \Delta T_{JL}$$

$\Delta T_{JL}$  is the increase in junction temperature above the lead temperature and may be found from Figure 4 for a train of power pulses or from Figure 1 for dc power.

$$\Delta T_{JL} = \theta_{JL} P_D$$

For worst-case design, using expected limits of  $I_Z$ , limits of  $P_D$  and the extremes of  $T_J$  ( $\Delta T_J$ ) may be estimated. Changes in voltage,  $V_Z$ , can then be found from:

$$\Delta V = \theta_{VZ} \Delta T_J$$

$\theta_{VZ}$ , the Zener voltage temperature coefficient, is found from Figures 2 and 3.

Under high power-pulse operation, the Zener voltage will vary with time and may also be affected significantly by the zener resistance. For best regulation, keep current excursions as low as possible.

Data of Figure 4 should not be used to compute surge capability. Surge limitations are given in Figure 5. They are lower than would be expected by considering only junction temperature, as current crowding effects cause temperatures to be extremely high in small spots resulting in device degradation should the limits of Figure 5 be exceeded.

## RATING AND CHARACTERISTICS CURVES

1N5338B THRU 1N5369B

Micro Commercial Components

### TEMPERATURE COEFFICIENTS

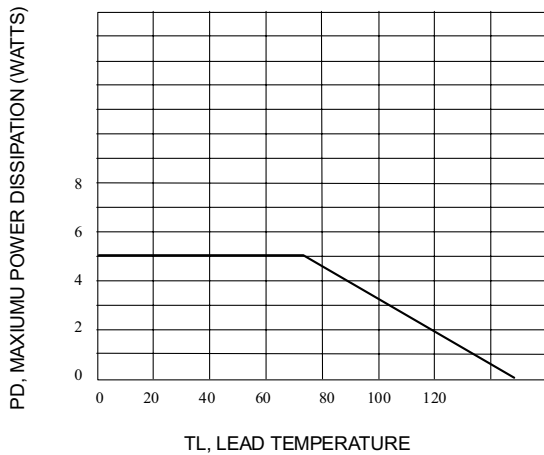


Fig. 1-POWER TEMPERATURE DERATING CURVE



Fig. 2-TEMPERATURE COEFFICIENT-RANGE FOR UNITS 6 TO 51 VOLTS

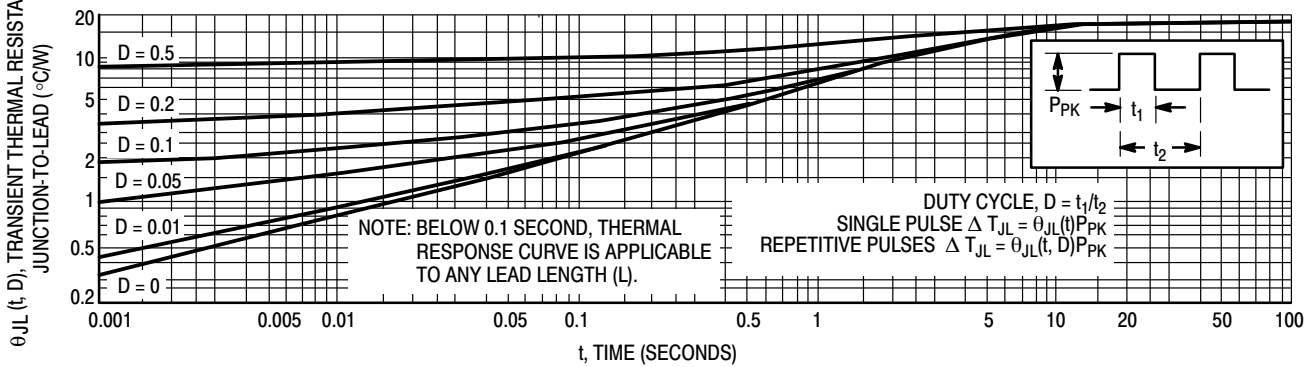


Figure 3. Typical Thermal Response  
L, Lead Length = 3/8 Inch

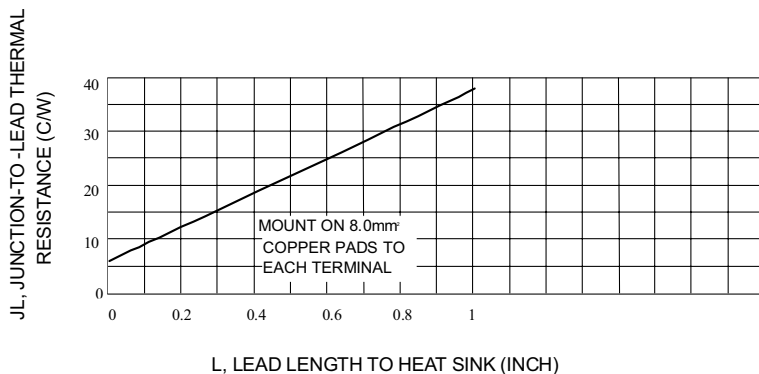


Fig. 4-TYPICAL THERMAL RESISTANCE

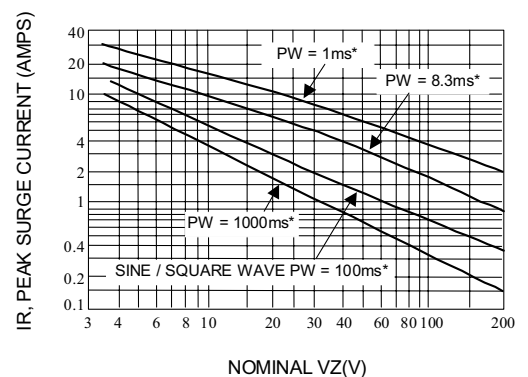


Fig. 5-MAXIMUM NON-REPETITIVE SURGE CURRENT VERSUS NOMINAL ZENER VOLTAGE (SEE NOTE 3)

RATING AND CHARACTERISTICS CURVES  
1N5338B THRU 1N5369B

ZENER VOLTAGE VERSUS ZENER CURRENT  
(FIGURES 7,8)



Fig. 6-PEAK SURGE CURRENT VERSUS PULSE WIDTH(SEE NOTE 3)



Fig. 7-ZENER VOLTAGE VERSUS ZENER CURRENT  
V\_Z = 6.8 THRU 10 VOLTS

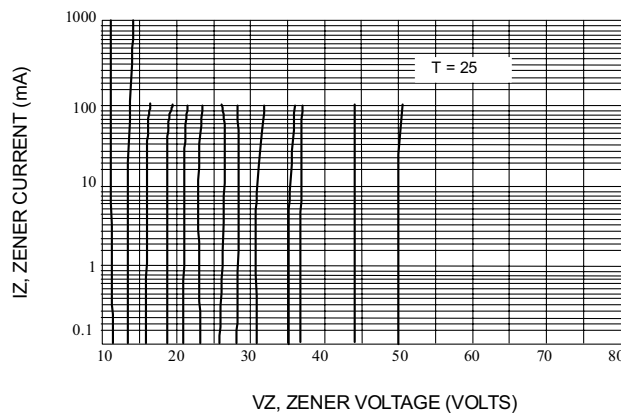


Fig. 8-ZENER VOLTAGE VERSUS ZENER CURRENT  
V\_Z = 11 THRU 51 VOLTS

\*\*\* Data of Figure 3 should not be used to compute surge capability. Surge limitations are given in Figure 5. They are lower than would be expected by considering only junction temperature, as current crowding effects cause temperatures to be extremely high in small spots resulting in device degradation should the limits of Figure. 5 be exceeded

## Ordering Information :

| Device         | Packing                      |
|----------------|------------------------------|
| Part Number-TP | Tape&Reel: 4Kpcs/Reel        |
| Part Number-AP | Ammo Packing: 3Kpcs/Ammo Box |
| Part Number-BP | Bulk: 25Kpcs/Carton          |

### \*\*\*IMPORTANT NOTICE\*\*\*

**Micro Commercial Components Corp.** reserves the right to make changes without further notice to any product herein to make corrections, modifications , enhancements , improvements , or other changes . **Micro Commercial Components Corp .** does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights ,nor the rights of others . The user of products in such applications shall assume all risks of such use and will agree to hold **Micro Commercial Components Corp .** and all the companies whose products are represented on our website, harmless against all damages.

### \*\*\*LIFE SUPPORT\*\*\*

MCC's products are not authorized for use as critical components in life support devices or systems without the express written approval of Micro Commercial Components Corporation.

### \*\*\*CUSTOMER AWARENESS\*\*\*

Counterfeiting of semiconductor parts is a growing problem in the industry. Micro Commercial Components (MCC) is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. MCC strongly encourages customers to purchase MCC parts either directly from MCC or from Authorized MCC Distributors who are listed by country on our web page cited below. Products customers buy either from MCC directly or from Authorized MCC Distributors are genuine parts, have full traceability, meet MCC's quality standards for handling and storage. **MCC will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources.** MCC is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.



**ООО «НИОКРсистемс»** - это оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов. Реализуемая нашей компанией продукция насчитывает более полумиллиона наименований.

Благодаря этому наша компания предлагает к поставке практически не ограниченный ассортимент компонентов как оптовыми, мелкооптовыми партиями, так и в розницу.

Благодаря развитой сети поставщиков, помогаем в поиске и приобретении экзотичных или снятых с производства компонентов.

### **Наша компания это:**

- Гарантия качества поставляемой продукции
- Широкий ассортимент
- Минимальные сроки поставок
- Техническая поддержка
- Подбор комплектации
- Индивидуальный подход
- Гибкое ценообразование
- Работаем по 275 ФЗ